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Project RYA: Observational Data Collection

RESEARCH REPORT

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### Summary

The purpose of this report is to describe the methodology developed on Project RIM to collect a large and systematic body of observational data for small groups confined for 21-day periods. The data collection was accomplished by two techniques: (a) a comprehensive behavior log systematically gathered by trained observers, and (b) the automated recording of video samples. The introductory section includes a brief description of Project RIM and details of the rationale for collecting subtle indices of social-psychological functioning. In subsequent sections, attention is focused on: (a) the behavior-log and video-sample observational techniques, (b) a description of the data collected, and (c) a description of the behavioral measures derived from the data collected (e.g., alone vs. together activity and body and eye orientation).

### Introduction

In 1962, Project ARGUS (Advanced Research on Groups Under Stress) was established at the Naval Medical Research Institute (NMRI) to investigate performance effectiveness of small crews in future weapons systems. Project RIM (Restricted, Isolated Monotony), representing the culmination of Project ARGUS, was an in-depth study of the behavior of 2-man and 3-man groups during a 21-day period of crowded, monotonous confinement. The purpose of Project RIM was to assess the effects of group size, intra-group compatibility, crowdedness and seniority of leadership on various measures of performance, interpersonal functioning, mood, symptomatology, biochemistry and electrophysiology. A full description of the purposes and procedures for Project RIM is contained in another NMRI Research Report (Walsh, Donenfeld, Smith, Haythorn, Briley, Burgoon, Colson, & Holiman, 1970).

The experiment was carried out in the "deep isolation" laboratory at NMRI. This laboratory consisted of a central control room and six highly-sound-reduced rooms. Observational data were systematically collected in the control center by monitoring audio and visual displays of the six rooms. A general description of the control center and the six experimental chambers is available in a previous NMRI Research Report (Smith, Myers, & Edmondo, 1967).

The purpose of this paper is to describe the methodology developed on Project RIM to collect a large and systematic body

of observational data. In all, a total of 81 subjects completed 1,576 man-days of confinement. Early data collection served to pilot-test the procedures to be reported here. Observational and many other forms of data were then gathered from a total of 56 subjects who took part in the main study and spent a total of 1,176 man-days in confinement.

The observational data consisted of measures of verbal and non-verbal behavior of individuals and groups. They were gathered to aid in the understanding of individual and group functioning during confinement. A review of methods and findings of previous research (Altman & Haythorn, 1967; Smith, Myers, Johnson, Milstein, Walsh, Mariow, & Kushner, 1967; Radloff & Helmreich, 1968; Smith, 1969; Altman & Lett, 1970) indicated that it was possible to collect observational data to assess patterns of such behaviors as territoriality (the claiming of objects and areas) and synchronization (the degree to which the activities of group members coincide in terms of time and the specific nature of the activity).

Other data emphases stemmed from the purposes of the current project. In addition to learning about the main and interactive effects of the four independent variables over time, interest was focused on the effects of extended periods of boredom and monotony that crews on long-term missions would be likely to experience. Hence, approximately 96% of the subjects' time remained unprogrammed and observational data collection was concentrated on these potentially boring free time activity periods.

An analysis of the specific physical and social setting under which Project RIM was conducted provided useful information to help determine what behavioral events would occur. In similar situations it has been observed that subjects often do not express overtly the same feelings toward other group members as they do covertly. For this reason, an attempt was made to get at some of the more covert methods that subjects might use to express their feelings. For example, such non-verbal measures as body orientation and eye orientation of an individual toward his partner might serve as subtle indices of the way he was attempting to maintain or avoid social contact.

Subtle behavioral measures of the type described above thus become major dependent variables of considerable interest in their own right. We believe that the collection of such measures will provide a better understanding of functioning in isolated and confined groups. The methods and behavioral measures described in this report may also prove useful in the investigation and understanding of individual and group functioning in various other situations.

In this report attention will be focused on:

1. Observational techniques used on Project RIM
2. A description of the data collected
3. A description of measures derived from the data collected

It is not the function of this paper to report any observational findings. Instead, the purpose is to provide procedural details

that would be too lengthy for journal presentation, but should be documented for the interested reader and researcher.

#### Observational Techniques

It was decided to use two observational techniques to collect the free-time observational data: (a) a comprehensive behavior log and (b) automated video samples. The data generated by both of these methods were gathered daily throughout the 24 hours on a systematic sampling basis. The schedule for the comprehensive behavior log and the automated video samples is presented in Figure 1.

Procedures for using the behavior log and the definitions of behavioral events to be recorded were outlined in an observer manual. Definitions of each behavior were as exhaustive and specific as possible to help insure a high degree of observational reliability. During confinement observers registered the occurrence of specific behavioral events throughout pre-scheduled sampling periods. Three-lettered alphabetical codes were devised for each behavioral event recorded to facilitate efficient, reliable and computer-compatible notation by the observers. The first letter of each code stood for the general category of the behavior and the two letters that followed stood for the specific behavioral subcategory (e.g., LTB refers to the general category of "location" and the specific subcategory of "top bunk").

Figure 1  
Comprehensive Behavior Log and Automated Video Sample Schedule

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<u>Time</u>	<u>Comprehensive Behavior Log</u>	<u>Automated Video Samples</u>	<u>Time</u>
0800		_____	0800
0900	_____	_____	0900
1000	_____	_____	1000
1100		_____	1100
1200		_____	1200
1300	_____	_____	1300
1400		_____	1400
1500	_____	_____	1500
1600			1600
1700		_____	1700
1800		_____	1800
1900	_____	_____	1900
2000		_____	2000
2100	_____	_____	2100
2200		_____	2200
2300		_____	2300
2400		_____	2400
0100	_____		0100
0200		_____	0200
0300	_____		0300
0400			0400
0500		_____	0500
0600			0600
0700	_____		0700

Procedures for the use and maintenance of the closed circuit television (video) sampling equipment were also contained in the observer manual. Although the video sample recordings were automatically taped and weren't scored until the end of the study, observers were responsible for the quality of each sample. Hence, they were required to play back each recording upon its completion. If anything was wrong with a sample, the observer immediately video taped a manual sample.

Responsibility for the collection of the observational data was given to fifteen undergraduate and graduate students who had had relevant psychological training. The observers worked on eight-hour shifts, working in pairs, except for low-activity early-morning hours during which only one observer was on duty. The observers received several days of on-the-job training and a 14-day pilot run was undertaken in the actual setting. As a result of the pilot run, additional behavioral subcategories were added to the comprehensive behavior log and definitions of several of the behavioral subcategories were modified. It also provided an opportunity to modify data collection forms and procedures to facilitate more efficient and reliable data collection.

### Data Collected

This section contains a description of the observational data collected from both the comprehensive behavior log and automated video samples.

#### Comprehensive Behavior Log

Observers systematically recorded information for each subject on five behavioral categories:

1. Type of activity
2. Location in the room
3. Talking
4. Desocialization (breakdown in adherence to general social norms)
5. Disobedience (violations of mission rules)

A listing of the subcategories for each of the above behavioral categories and the data recording form used are presented in Figures 2 and 3.

These data were collected during eight blocks of time, each for the duration of one hour. Specific scheduling details are presented in Figure 1. Each sample hour was divided into six 10-minute periods. During these 10-minute periods, each observer recorded 3 minutes of data from each of his three pre-assigned rooms. A mission clock and stop watch helped the observers keep track of sample time periods. Activity and location data for each subject were the first entries recorded during the 3-minute sampling period. These entries represented the dominant activity and location of each subject in the room. If a subject was engaged in more than one activity or changed his location, and

**Figure 2:** Subcategories of the Comprehensive Behavior Log

ACTIVITY	LOCATION	TALKING	VIOLATION	DESOCIALIZATION
AEX - Exercise	LTB - Top bunk	TRP - Talking about immediate situational room matters in a personal probing manner	VNJ - Not wearing jersey	SWH - Washing hands, face, teeth, body, hair, etc.
AGA - Playing game alone	LMB - Middle bunk	TRN - Talking about immediate situational room matters in a non-personal superficial manner	VOC - Attempting outside communication	SPG - Personal grooming - nails, hair shoes, shaving
AGT - Playing game together	LBB - Bottom bunk	TNP - Talking about non-room matters in a personal probing manner	VFE - Moving furniture or equipment	SCR - Cleaning room (desk, floor, refrigerator, etc.)
ARW - Reading, writing or drawing	LFC - Far chair	TNN - Talking about non-room matters in a non-personal superficial manner	VTD - Tampering/damaging equipment	SSR - Setting table for meals or snacks
ADN - Doing nothing, awake, inactive	LMC - Middle chair	TCO - Complaints of all sorts	VSB - Smoking in bed	SCC - Changing clothes - putting on clean clothes
APA - Inactive, perhaps asleep	LNC - Near chair	TCS - Complaints to staff	VOD - Opening door at improper time	SMB - Making bunk
ADA - Inactive, definitely asleep	LFL - Lying or sitting on floor	TAB - Talks of riot	VTQ - Improper questionnaire task procedure	
APP - Preparing food	LHD - Head (toilet)	TCC - Talking, can't classify singing, tapping, etc. )		
AEA - Eating alone	LDM - Desk, middle (sitting at)			
ATE - Eating together	LDO - Desk, other than middle (sitting at)			
ATQ - Taking questionnaires, doing tasks, medical monitoring	LSD - Sitting on the desk			
	ISN - Standing, near camera			
	LSF - Standing, far from camera			
	LRM - Random moving about, pacing			
	LSB - Sitting on the bunk			

Figure 3. Comprehensive Behavior Log Data Recording Form

HOUR SAMPLED	ROOM	SHIFT	DAY	DATE	OBSERVER	
SAMPLE	MAN A - NAME Act Loc Tlk Soc Viol	ID# Comments	MAN B - NAME Act Loc Tlk Soc Viol	ID# Comments	MAN C - NAME Act Loc Tlk Soc Viol	ID# Comments
1						
2						
3						
4						
5						
6						

dominance could not be assessed, more than one entry was made. This situation did not often occur since the activity and location categories were merely intended to provide a "still picture" of the room at one specific time. The remainder of the sample time for each room (approximately two minutes) was devoted to recording all behaviors in the remaining three categories: talking, desocialization and disobedience. No additional activity and location entries were made during this time. All subcategories of talking, desocialization and disobedience that occurred were recorded on the log form. None were entered more than once for each subject during any specific three-minute sampling period. If none of the listed subcategories applied, the appropriate space on the log form was left blank.

The reliability of behavior log observations was assessed by recording a 1-hour video tape of actual subjects in the experiment. Eight observers completed the comprehensive behavior log for this reliability test tape under simulated run conditions. Inter-rater reliability was calculated by scoring each set of entries or non-entries as a match or mismatch and dividing the number of agreements by the number of agreements plus disagreements. Reliabilities on the five categories were as follows:

Activity	88%
Location	87%
Talking vs. no talking	92%
Desocialization	92%
Disobedience	100%

In each case save talking, the reported reliability is the average for all relevant subcategories. Such subcategory agreements ranged from 85% to 100%. In the case of talking, the reported figure was based only on agreement as to presence or absence of talking because the subcategory agreements were low, being but 50% to 65%.

#### Automated Video Samples

Automated video samples of 20-second duration per room were taken sixteen times a day during free-time activity periods. Specific scheduling details are presented in Figure 1. These video tape recordings began with a 20-second view of the mission clock (showing the experimental run, day and time), and then 20-second exposures of rooms 1 through 6, in that order. Representative video samples have been initially scored for several behavior categories (as detailed in Figure 4). For this first look at the free-time video sample data base we examined only hours when people were apt to be awake and socially interactive. The entry for each category was the behavior that the subject displayed longest during each 20-second sample. An exception was the talking category where any communicative speech not expressed at random was noted.

The reliability of the scored video samples was assessed by having both raters score the same video samples for one day of each run and calculating the extent of inter-rater agreements.

Figure 4  
Automated Video Sample Behavioral Categories

1. Bed activity
  - a. Asleep
  - b. Awake
2. Bed location
  - a. On bed
  - b. Off bed
3. Body orientation
  - a. Facing
  - b. Not facing
4. Eye orientation
  - a. Yes
  - b. No
5. Talking
  - a. Yes
  - b. No
6. Interaction
  - a. Yes
  - b. No
7. Activity
  - a. Similar
  - b. Dissimilar
8. Desk location
  - a. Middle of desk
  - b. Other than middle
  - c. Not at desk
9. Doing nothing
  - a. Yes
  - b. No

The reliabilities obtained were as follows.

Bed (on-off)	98%
Bed (activity)	95%
Desk location	91%
Body orientation	91%
Interaction	91%
Activity	91%
Doing nothing	96%
Eye orientation	93%
Talking	93%

#### Measures Derived From The Data Collected

Many measures are derivable from the observational data by the use of such methods as frequency tallies and percentages.

Some potential measures from the comprehensive behavior log and the automated video samples of greatest interest to us include:

1. Social activity
2. Territoriality
3. Sleep patterns and changes in diurnal cycles
4. Restlessness
5. Boredom
6. Desocialization (breakdown in adherence to general social norms)
7. Disobedience (violation of mission rules)

In deriving measures to assess the behavior of small groups of individuals, all possible subgroups as well as the total group can be examined for any day or time of day. For the two-man groups, measures are obtainable for:

1. Each individual
2. Each individual relative to his partner
3. The total group (dyad)

The three-man situation is of course more complex. In this situation, measures can be derived in terms of:

1. Each individual
2. Each individual relative to each of his partners
3. Each individual relative to the remaining dyad
4. Each of the possible dyads within the triad
5. The total group (triad)

The remainder of this section consists of brief descriptions of potential measures we currently plan to derive from the observational data collected.

#### Social Activity

It has been generally found that members of confined groups often experience interpersonal friction and also tend to withdraw socially over time. The observational data from the log and video samples provide several measures for assessing extent of social activity and synchronization of group members' activities. These measures fall into four categories:

1. Alone vs. together behavior
2. Social interaction
3. Talking
4. Body and eye orientation

Alone vs. together behavior. One index of a confined subject's propensity toward social withdrawal is the amount of time he spends doing things alone instead of with his partner. A broader measure is the extent to which he tunes or synchronizes his overall schedule to that of his partner. A general index of alone vs. together behavior is the percentage of time that a subject spent asleep, in activity alone, or together with each partner. Alone vs. together indices can be derived similarly for specific activities such as game playing. Synchronization

can be examined by pooling information about the timing and togetherness of various activities, (e.g., eating), and the timing of sleep periods.

Social interaction. This measure of social activity, as scored from the automated video sample data, was defined as showing awareness of the presence of one's partner by exhibiting such behaviors as facial glances, conversation, or behavior dependent upon or influenced by the activity of the partner. The percentage of time social interaction occurred can be calculated for each subject relative to each other subject in his room. Additional information is obtainable by calculating the percentage of social interaction for each subject when he is engaged in (a) similar activity and, (b) dissimilar activity, relative to every other man in the room.

Talking. Talking is another means to assess social activity. These data are available from both the log and video samples. Of interest are measures such as the time each subject spent talking and the difference between partners in the amount each talked.

Body and eye orientation. Since subjects in confinement often do not express private feelings toward other group members by overt behavior, measures of more subtle, covert behavior may serve to assess better the extent of and changes in social activity. One promising approach is to obtain measures of body and eye orientation. The automated video sample data have been scored for these behaviors of each subject relative to each other subject in the room.

Other indices can also be derived that combine the measures of orientation with other activities such as body orientation to partner when the subject is also:

1. Interacting
2. Not interacting
3. Doing nothing
4. Talking
5. Not talking
6. Engaged in similar activity
7. Engaged in dissimilar activity

#### Territoriality

Increased territoriality for objects and areas has been observed in socially isolated groups. Indices of territoriality are available from subcategories of the behavior log, e.g., the extent to which each subject occupied or preferred specific bunks, chair locations, portions of the desk, and given areas of the room. The number of times subjects occupied or used various room locations or objects can be obtained and examined for territorial preferences or dominances.

#### Sleep Patterns and Changes in Diurnal Cycles

It has been generally observed that socially isolated groups exhibit changes in sleep patterns and diurnal cycles. Information from which to assess these changes is available from the activity and location subcategories of the behavior log and video samples. Examples are: percentage of time each subject spent (a) in bed, or (b) in bed asleep or quiet.

Restlessness

It has generally been found that the greater the amount of restlessness exhibited by a person in confinement the greater the difficulty he will have adapting to and remaining in that environment. Some crude indices of general restlessness probably are contained in the comprehensive behavior log data. General restlessness for individual subjects can presumably be inferred from the number of activity and/or location changes during the six successive 3-minute room samples per hour.

Boredom

A major problem of socially isolated subjects is their inability to handle extended periods of free time. Boredom is a common complaint. In the current study, crude indices of boredom are obtainable from the observational data. The percentage time each subject was awake but was doing nothing is likely to be a promising approach.

Desocialization (Breakdown in Adherence to General Social Norms)

One probable result of social isolation is a diminishing adherence to general social norms, as conventional external standards of behavior become less salient. This potential change can be assessed from behavior log desocialization data by summing the occurrences of any of the subcategories for each subject at various time periods.

Disobedience (Violations of Mission Rules)

It has been generally found that much of the hostility and frustration of socially isolated groups is directed toward people external to the group, sometimes in the form of disobedience of rules and regulations. The comprehensive behavior log can be used to assess the extent of such disobedience. Measures for each subject are obtainable by summing the number of occurrences of any of the violation subcategories.

Other Potential Measures

New measures will probably be formulated as the raw data are reduced, analyzed, and interpreted. Hypothesis testing has been facilitated by the establishment of permanent storage of the log and video sample data on IBM punched cards. The automated video sample tapes will also be retained for possible additional data extraction.

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## Footnotes

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